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(54) Title: TELECOMMUNICATIONS NETWORK
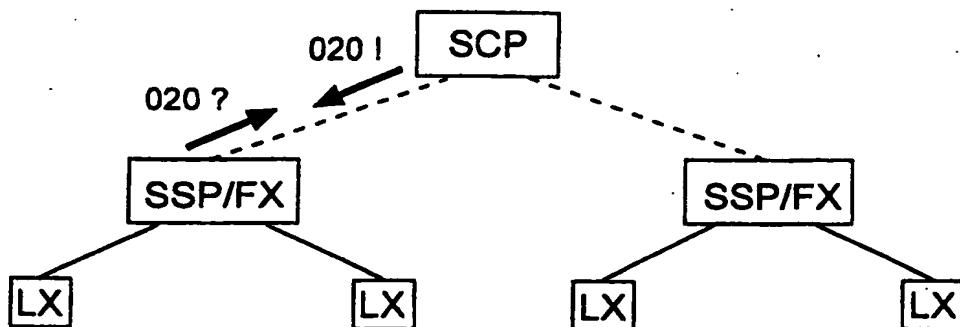
(57) Abstract

Telecommunications network including subscriber equipment by which a subscriber can be provided telecommunications services from the network (via an operator), and one or more units with control logic/control functions (SPP;SCP) which are located in the network and which execute telecommunications services in cooperation with the subscriber equipment. The units with control logic/control function are located in an IN–platform and consist of conventional SPPs and SCPs and a special computer SCP2 which contains logic for call control arranged in an architecture where the call management is executed in the conventional SCPs and where ACD (the call control) is executed in said public SCP2 and that the communication with the client applications of the subscriber equipment is executed via transparent signalling between SCP2 and the client applications.

TITLE OF THE INVENTION: TELECOMMUNICATIONS NETWORK

TECHNICAL FIELD

Telecommunications network including subscriber equipment
5 by which a subscriber can be provided telecommunications
services from the network (via an operator) and one or more
units with control logic/control functions (SPP;SCP) which
are located in the network and which execute
telecommunications services in cooperation with the
10 subscriber equipment.

PRIOR ART

Companies and organizations in branches where one
communicates with the customers by means of telephone are
today working hard to increase the efficiency and the
15 quality in the treatment of the customers. A strong trend
is that telephony- and computer systems are being
integrated in order to reach this aim.

In Sweden we have a long tradition of local attendance in
many branches. People's demand for flexibility also results
20 in that many activities which previously have been
centralized, are becoming more and more decentralized. This
also makes demands for geographically free system
solutions.

Another pronounced trend is that companies want to focus on
25 their "core activities", and by that the interest in out-
surcing and purchasing of functions has increased.

A number of years ago the main task for the
telecommunications network was to handle calls between
subscribers. Today almost all old technology in the
30 telecommunications network has been replaced by modern
computer technology with a special architecture which is
called IN-technology (Intelligent Network services).

IN utilizes an existing network, but is logically separated from this. By logically separated is meant that IN has a network structure of its own which is located "on top of" the telecommunications network. The communication between
5   nodes in IN is executed with regard to the physical connections the telecommuncations network offers. All this implies that IN is independent of the network on which it is operating. It doesn't matter whether the underlying network is broadband, ISDN, or a packet network. IN,
10   consequently, can be said to be independent on which access network one in the actual case is making use of.

The reason for the development of IN was on one hand that the operator should have possibility to develop own
15   competitive services with own specific technical solutions in order to optimally utilize the existing network, and on the other that the market demanded a development of services to achieve a better extent of utilization of the capacity in the existing networks. The integration of
20   telephony- and computer systems makes great demands on the structure and the communication between the in the telephone network existing equipment and the user's equipment.

25   Further is shown by the document WO,A1,95/04 436 a way to communicate data between two network terminations without the need to set up a call.

TECHNICAL PROBLEM

30   A superior problem at the present invention is to create a more efficient system structure for computer-telephony solution for geographically distributed activities, and at the same time use the in the network existing IN-

architecture in a more supple way resulting in a more
efficient control of the calls, and that its realization is
made in the public network.

5   ACD - or Automatic Call Distribution - is a
telecommunications service which has existed in the digital
PABXes (Private Automatic Branch Exchange) for many years,
where calls are distributed automatically in an
"intelligent" way. ACD is also used as a concept for all
10 handling of calls in a so called Call Center, i.e. a place
where one has a great concentration of incoming and/or
outgoing telephone traffic (booking center, telephone
sales, etc). All companies actually want to handle <u>all</u>
incoming calls, and handle these in an optimal way (all
15 calls being answered, and answered by right person). This,
however, is not possible in all situations. The reasons for
this is that there are variations in traffic intensity, and
that not all administrative officials manage to handle all
types of matters, or that certain administrative officials
20 also have other tasks than answering telephone calls.
Handling of incoming telephone traffic can be seen as a
number of problems according to the following:

1.   There momentarily can be more incoming calls than can
be handled.
25 2.   There permanently can be more incoming calls than can
be handled.
3.   The administrative officials can not handle all types
of matters.
4.   The administrative officials who handle a type of
30 matter are not equally suitable for this.
5.   All administrative officials are not in the same
physical working place.
6.   Administrative officials can be located outside the
company, for instance at home.

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Another problem is that an ACD which shall cover all
geographical places, equipments and network connections of
an organization is not possible with the present ACD-
technology which is restricted by the mentioned factors.
5   The previous solutions do not use IN-technology but PABX-
connection to the network to effect ideal ACDs.

TECHNICAL SOLUTION

The technical solution is specified in the patent claims.

ADVANTAGES

10 By the present invention the public telecommunications
network is improved and made more customer adapted.

Further is by the invention a solution created which gives
new possibilities to create new cost efficient computer-
telephony solutions for geographically distributed
15 activities.

- Calls can be distributed to answering positions for
  different places.
- Efficient call control - all staff in a distributed
  organization can receive calls.
20 - Computer integrated telephony - customer information can
  be presented to the person in charge of a matter before
  the call is answered.
- Supervision and statistical functions make possible
  efficient staff management and planning of activities.
25 - Cost connected to service content and amount of traffic.

DESCRIPTION OF FIGURE

Figure 1 shows the prior art.

Figure 2 shows the system solution according to the
30 invention.

DETAILED DESCRIPTION

In order to facilitate the understanding of the present
invention, explanations of the used abbreviations are given
below.

5   SSP: Common (ordinary) SSP.

     SCP: Conventional SCP based on AXE-10.

     AST-DR: Conventional recorded announcement machine for
10   playing of phrases. Is here used for playing of
            general messages, addresses of welcome, menu trees,
            and for reception of DTMF-figures from the A-
            subscriber.

     SCP2:   General Unix-computer which is both an SDP and an
15   SCP2.

     IV: Infovox 3000 is used as message server; stores and
            plays messages which the callers can give if a)
            they choose to do it because the queue is regarded
20   to be too long, or b) if selected function or the
            whole service is closed.

     RAS: A Remote Access Server which is used to transport
            signal information from the operators' terminals to
25   the LAN backbone of the SCP2 if a router connection
            is not cost efficient. Can be used for both modems
            and ISDN-connections.

     RT: IP-router which is used to transport signal
30   information from the operators' terminals to the
            LAN backbone of SCP2 when there are a lot of
            operators in the same place and/or if the customer
            already has a WAN-infrastructure for his/her
            terminals.

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DB: The customer's database/application server which "talks" with the OP-applications via a DDE-interface, not necessary for the service to function.

PASTEL: Telephony hardware which supports TAPI; all hardware with TAPI-support can be used.

Modem: It is used for distributed workplaces, also ISDN can be used when suitable hardware exists.

Freephone (access number usually 020) is often a basic component to build up a call center, telephone based customer service. Freephone makes it possible to have one single number to a multiple of answering positions. This fact, and that one calls free of charge to freephone, facilitates the communication for a call center. In freephone one can, by a number of network control functions, route calls to a freephone number to a number of different answering positions which results in that companies which have the number can utilize their resources (staff, equipment) more efficiently.

In the network today the freephone logic is controlled from a pair of SCPs which communicate with SSP which is on transit level in the network.

In Figure 1 is shown the today prevailing solution for freephones; a subscriber calls a 020-number at which the local exchange recognizes that it is a freephone call and forwards connection of the call to the SSP of the transit exchange, which questions SCP where to forward the call. In SCP there then is a program which is written explicitly for the service in question, with control parameters which for instance depend on the geogaphical position, time, call distribution, load etc. The IN-solution of today is built for the services which have been developed "once and for

all", and not for services which are changed for instance 37 times in 24 hours. This solution is to its nature very static.

Depending on how these control parameters are adjusted, or
5   preprogrammed, for the customer who subscribes to the call center service, the call is forwarded.

The call can for instance be connected to a PBX located at for instance a telephone bank which has connected the administrative support system of its company to said PBX.
10   This results in that one can connect call and display image, with data about the one who is calling, to the operator who answers the call, who then also has the data information accessible.

15   By the invention, see Figure 2, is shown an architecture or system solution for an automatic answer management which gives a greater flexibility, customer control and status - and statistical information. As can be seen in the Figure, a general computer SCP2 is connected to an SCP (which may
20   be a conventional SCP in the network today). These computers are connected to each other via an INAP protocol. We consequently has a solution where ACD-logic is introduced into an ACD-server and the call management in IN (SCP), at which the communication is made via transparent
25   signalling between ACD-server and the client applications.

A subsciber who calls a company (which is in possession of this service) usually has a number of questions which he/she wants to have answered in best possible way. The company can optimize this by causing the customer to speak
30   to "right" person. Who is right person often can not be found from the information one has about the call before this has been answered. It therefore is suitable to divide the administrative officials of the company in "sections" (ACD-groups) which corresponds to the most important needs

of the customers and who it is possible to sort out before the call has been answered.

The information one has about the call before it is answered is:

- A-number; the telephone from which the customer is calling.
- B-number; which number he/she has dialled.
- Reception area; where is the customer geographically.
- Time/Date/Day of the week etc.
- Which branches has he/she visited in the voice menu.
- Which codes has he/she entered by keys in the voice menu.

In addition, one has in the ACD-service knowledge about

- Which administrative officials are logged in and ready to receive calls.
- Which groups are opened for traffic.
- Which groups do the different administrative officials serve, and in which priority do they take calls from different groups.
- etc

All, or parts, of this can be used to distribute calls on groups. The groups therefore must be selected according to how they can be distinguished. This can vary between different companies.

The service ACD has four interfaces towards the customers.

The customer's customer, the one who is calling the service, has an interface via telephone which consists of keying and interactive recorded announcements.

The customer's administrative officials/operators can be connected via a) an ordinary telephone, or b) be connected to the service via a graphic user interface of a computer.

The customer's chief operator is always connected via a computer with a data communication link to the service.

The following will happen in chronological order when a customer makes a call to a company which subscribes to the ACD-service:

The call is detected as an IN-call and an inquiry is sent to SCP about where to route the call. SCP detects that this is a call to the ACD-service, plays a message of welcome, if any, ("Welcome to Future Journeys") and a menu, if any, ("For international journeys, press 1; For domestic journeys, press 2; If you are a VIP-customer, press 3 etc) receives all key-enterings made by the customer, parks the call temporary and asks SCP2 about what to do.

In SCP2 the call is identified as call to a customer's ACD and a distribution to right answering group (ACD-group) is made according to one or more of following alternatives:

• The reception area the call is coming from (with regard to A-number);
• Time of the 24-hour period, and/or date.
• Depending on identification which the customer is giving via voice menus.
• Based on the called number or parts of this.
• Based on load distribution between ACD-groups.
In a voice menu one can in addition let a customer chose to:
• Wait in queue, with not replaced handset.
• Give A-number (if not ANI)
• Give a recorded speech and replace the handset; the ACD-operator then can call when he/she will have time.
• Become connected to the company's telephone operator.

While queuing, the customer is continuously informed about that he/she is queuing. When an operator is free in selected ACD-group (queue), the call will be established.

If there is no queuing to the ACD-group, but instead a number of available operators, one of them is selected according to not occupied time, load index or priority towards other operators:

5 The operator's task is to serve (answer calls from) the ACD-groups he/she belongs to, according to the chief operator's configuration.

There are in the prototype two main variants for connection of operators:

10 1)   PC-operator; ACD-operator with PC who signals by the service; and

2)   DTMF-operator; ACD-operator with only an ordinary analog telephone with DTMF.

15 The optimal for an operator is a PC workplace (PC-operator). Then one can benefit from all advanced functions the service can offer, and get full survey over status of the service, groups and operators (not least one's own status).

20 DTMF-telephone can be utilized (DTMF-operator), but is only an alternative for customers who only want to utilize the simplest functions in the ACD-service, or who want to use ACD as an advanced Call-Pickup, calling around etc.

The PC-operator has a workplace consisting of following:

25 Standard PC (Windows) with modem/PSTN-card/ISDN-card, telephone/earpiece and the operator application "OP".

When the operator starts the operator application (OP), or from this wants to log in, a dialog square is presented which asks for user-ID and password.

30 After a succeeded log in towards the service, the operator can work with the operator application.

An important part of the ACD-service which is located in SCP2 is that the customer's operators and chief operators

can get information about status changes. This is status of number of incoming calls, calls in progress, queuing calls, queuing times, status of operators (how many are active, who do now serve which ACD-groups, status of ACD-groups
5   etc). This status information is important in a distributed ACD where the operators are not sitting in the same room, are belonging to different groups etc. The importance of information will increase by the use of sophisticated algorithms for who are members of ACD-groups, thresholds,
10   auto-login, priorities etc.

This status information is collected and signalled to operators and chief operators. This is done by SCP2 containing powerful algorithms and data structures.

15   SCP2 communicates with the operator terminals (in form of PCs) via standardized WAN-protocols.

The operator terminals in their turn control the telephone connection via the industrial standard TAPI and communicate with the ACD-functions in SCP2 via a Telia-specific
20   protocol on WAN.

The communication with SCP from SCP2 is executed by an update signal. Consequently one has asynchronous, bi-directional, communication between SCP and external computer.

25   The communication with SCP can be executed from external equipment via update signal asynchronously in both directions with service unique application protocol pigg-back in the update signal.

Communication Operator terminal - SCP2.

30   The WAN-connection between OP and SCP2 can be implemented by different carriers. This link is based on standard communication protocol (TCP/IP) and on standard access in the customer computers (WinSocket). What we have done in

the ACD-service is to use exactly the same software as the
de-facto standard in the computer industry for WAN-
communication, which results in that all ways to connect a
computer to Internet/Intranet can be used to connect a
5   computer to ACD. If the company has a LAN, the computers
can be connected via this, a remote workplace can be
connected via RAS-technology via modem or ISDN. The
signalling can go via public data networks, private data
networks, or entirely in Telia's infrastructure (for
10   instance TIPNet). A workplace which is connected to a PABX
with digital line card can use the data channel in this to
transmit this information.

It can be argued that this signalling cannot be used in a
15   public network (security) or in a packet network (no
guarantee for when packets are delivered), and if this
results in that such solutions cannot be made, solutions
can be made under private management without the
architecture being changed.

20   The most elegant solution of this is to use ISDN with
transparent signalling on the D-channel. If one packets
TAPI with ISDN duo, one has a complete packet with CTI
which can be used both at offices, at home and in
distributerd workplaces, for CTI-connection to all IN-
25   services, etc.

Client softwares based (operator and chief operator) on
TAPI (Telephony Application Programming Interace) implies
that one builds on an open architecture which is supported
30   by all suppliers and operators. TAPI is an open
architecture for CTI which gives possibilities to bulid in
any services one wants, without this infringing on the
standard. That is, one can build TAPI-support for one's
services without this influencing the software of other

suppliers; a telephone selling program from "SelOnTel Ltd"
can be run on the same machine as ACD OP with the same
telephone hardware without problems.

The TAPI-architecture results in that one provides a clear
interface (TAPI) for what is one's own system, and what is
the customer's; this means that one can sell telephone
applications with telephone support (such as ACD) without
knowing what the customer's data system looks like, or that
changes are needed in this to make the system work.

The invention is only limited to what is indicated in the
patent claims, so the idea of invention is applicable to
all types of communication services which get their
realization in the network.

14

PATENT CLAIMS

1.   Telecommunications network including subscriber
equipment by which a subscriber can be provided
5   telecommunications services from the network (via an
operator), and one or more units with control logic/control
function (SPP; SCP) which are located in the network and
which execute telecommunications services i cooperation
with the subscriber equipment, c h a r a c t e r i z e d in
10 that the units with control logic/control function are
located in an IN-platform and consist of conventional SPPs
and SCPs and a special computer SCP2 which contains logic
for call control arranged in an architecture where the call
management is executed in the conventional SCPs and where
15 ACD (the call control) is executed in said public SCP2 and
that the communication with the client applications of the
subscriber equipment is executed via transparent signalling
between SCP2 and the client applications.

20 2.   Telecommunications network according to patent claim
1, c h a r a c t e r i z e d in that SCP2 consists of a
conventional computer.

3.   Telecommunications network according to patent claim
25 2, c h a r a c t e r i z e d in that the subscriber´s
computer equipment cooperates with SCP2.

4.   Telecommunications network according to patent claim
3, c h a r a c t e r i z e d in that unit which contains
30 control logic/control function consists of an SSN (Stand
alone Service Node).

15

5.   Telecommunications network according to patent claim
2, c h a r a c t e r i z e d in that the telecommunications
service is dynamically changeable from the subscriber
equipment.

5

6.   Telecommunications network according to patent claim
1, c h a r a c t e r i z e d in that the customer´s
operators from SCP2 kan get information about status
changes, such as number of incoming calls, number of calls
in progrss, number of queuing calls, queuing times, status
of operators etc, which together with normal call
information gives a more efficient call control.

7.   Telecommunications network according to any of the
previous patent claims, c h a r a c t e r i z e d in that
the operators´ working tools consist of computers.

8.   Telecommunications network according to any of the
previous patent claims, c h a r a c t e r i z e d in that
the operators´ working tools consist of conventional
telephones.

9.   Telecommunications network according to any of the
previous patent claims, c h a r a c t e r i z e d in that
SCP2 communicates with the operator terminals (in form of
PCs) via standardized WAN-protocols, and the operator
terminals in their turn control the telephone connection·
via the industrial standard TAPI and communicate with the
ACD-functions in SCP2 via a Telia-specific protocol on WAN.

10.   Telecommunications network according to any of the
previous patent claims, c h a r a c t e r i z e d in using
ISDN with transparent signalling on the D-channel.
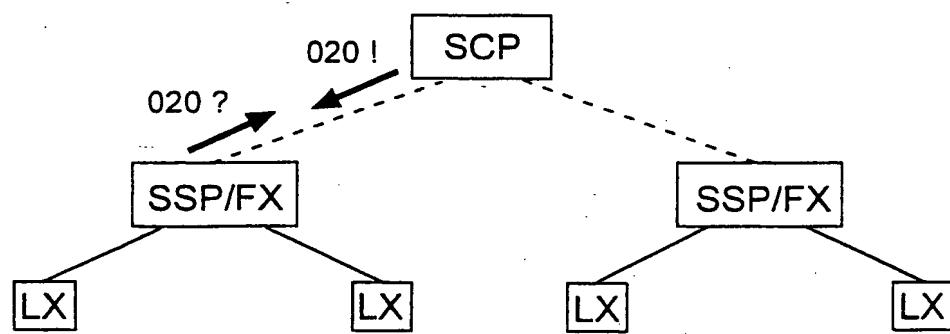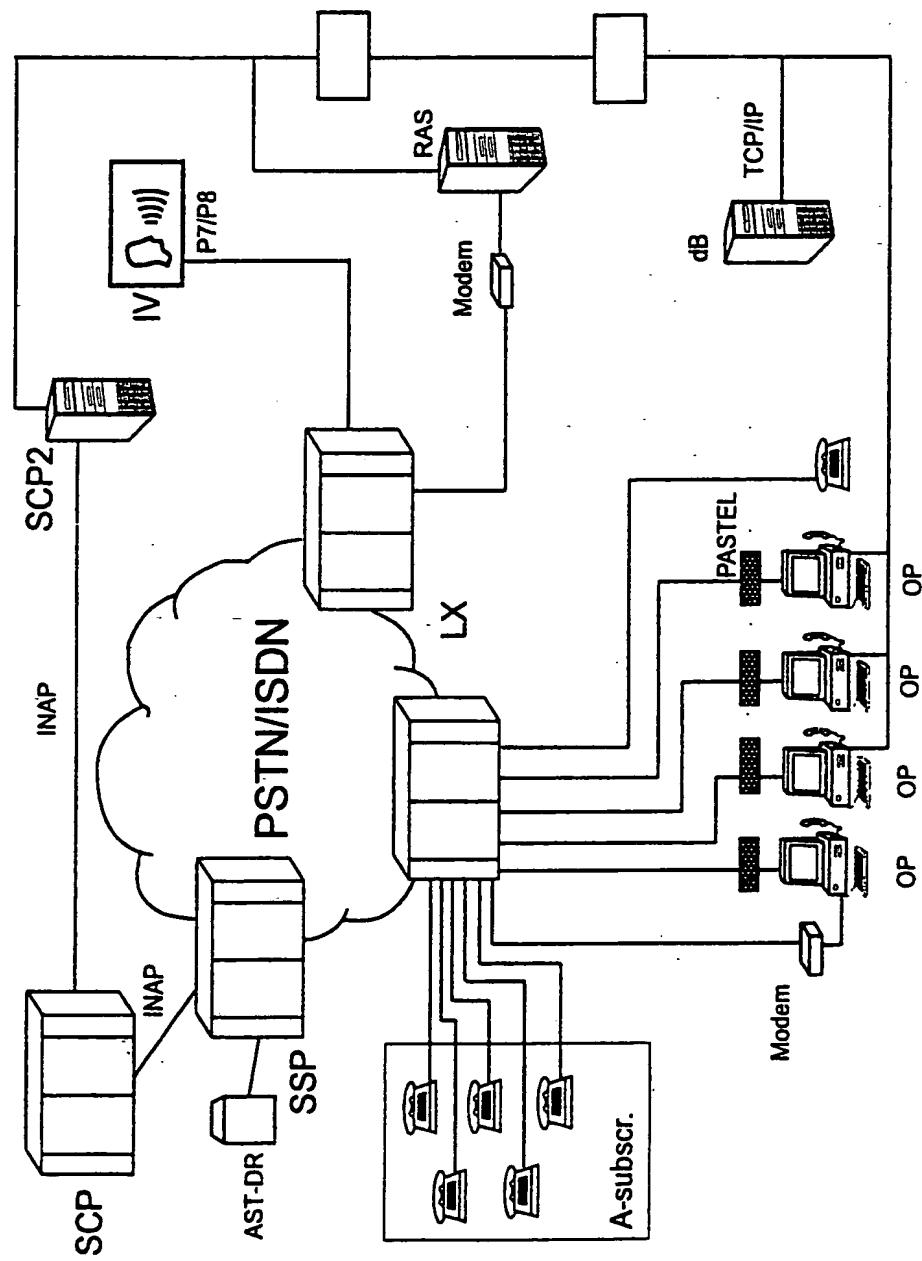
Figure 1

Figure 2

1

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04M 3/42, H04Q 3/64, H04Q 3/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04Q, H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5452350 A (HENRY S. REYNOLDS ET AL), 19 Sept 1995 (19.09.95), figure 1, abstract --	1-10
A	US 5461669 A (BERNARD VILAIN), 24 October 1995 (24.10.95), column 6, line 67 - column 7, line 17 --	1-10
A	US 5694463 A (JOSEPH MICHAEL CHRISTIE ET AL), 2 December 1997 (02.12.97), column 4, line 18 - column 5, line 9 --	1-10
A	EP 0762784 A2 (ALCATEL SEL AKTIENGESELLSCHAFT), 12 March 1997 (12.03.97), abstract --	1-10

[X] Further documents are listed in the continuation of Box C.   [X] See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" erlier document but published on or after the international filing date	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 July 1998	2 1 -07- 1998
Name and mailing address of the ISA/	Authorized officer
Swedish Patent Office Box 5055, S-102 42 STOCKHOLM	Friedrich Kühn
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/00570

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	EP 0804044 A1 (SIEMENS AKTIENGESELLSCHAFT), 29 October 1997 (29.10.97), see the whole document	1-10

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
US	5452350	A	19/09/95	EP US	0559979 5768360	A A	15/09/93 16/06/98
US	5461669	A	24/10/95	AU AU CA EP FR JP	665099 4204493 2101459 0583190 2694466 6169479	B A A A A,B A	14/12/95 03/02/94 30/01/94 16/02/94 04/02/94 14/06/94
US	5694463	A	02/12/97	NONE			
EP	0762784	A2	12/03/97	CA DE JP US	2184106 19532490 9168056 5748710	A A A A	03/03/97 06/03/97 24/06/97 05/05/98
EP	0804044	A1	29/10/97	NONE			